An Investigation into E-business Service in the UK Telecommunication Manufacturing Industry

Authors:

*Dr. Ying Yang
Senior Lecturer in Operations Management, Newcastle University Business School, Newcastle University, Newcastle, UK
Email: ying.yang2@newcastle.ac.uk

Dr. Biao Yang
Senior Lecturer in Operations Management, School of Business and Management, University of Sussex, Brighton, UK
Email: biao.yang@sussex.ac.uk

Prof. Paul Humphreys,
Professor of Operations Management, Department of Management & Leadership, University of Ulster, Jordanstown, UK
Email: pk.humphreys@ulster.ac.uk

Prof. Ronan McIvor
Professor of Operations Management, Department of International Business, University of Ulster, Magee, UK
Email: r.mcivor@ulster.ac.uk

Dr. Trevor Cadden
Senior Lecturer in Operations Management, Department of Management & Leadership, University of Ulster, Jordanstown, UK
Email: t.cadden@ulster.ac.uk

*corresponding author

An Investigation into E-business Service in the UK Telecommunication Manufacturing Industry

Abstract

Nowadays, suppliers' product and service quality has risen in importance with a manufacturer's push to develop core competencies and capitalise on global operations and markets. However, due to the complex features of business service, suppliers are facing significant challenges in providing service effectively and developing business collaboration. This is further complicated by the development of information and communication technologies (ICTs). This paper thus attempts to investigate the factors influencing buyers' e-service (EBS) requirements and the impact of these requirements on business collaboration. Based on a questionnaire survey with 500 UK telecommunication manufacturers, this research identifies buyers' different EBS requirements for different types of suppliers and the impact of ICTs on EBS requirements. While for suppliers our findings provide insights into buyers' EBS requirements, they can help buyers to develop appropriate supplier selection criteria. The findings also contribute to a better understanding of the development of buyer and supplier business collaboration.

Keywords

business service; information and communication technologies (ICTs); manufacturer and supplier collaboration; UK telecommunication manufacturing

An Investigation into E-business Service in the UK Telecommunication Manufacturing Industry

1.Introduction

Business service has been extensively researched from a number of perspectives, such as business to business (B2B) service, professional service and industrial service. The focus of business service was originally on the distribution and exchange of manufacturing goods, which were standardised and produced for the mass market. Over time, due to technological developments and changing market conditions, the feasibility of and need for customised goods has significantly increased. As such, business service has become more tailored for individual customers. The growing importance of business service has also been highlighted in the general trend towards the increased servitisation of manufacturing goods (Vandermerwe and Rada, 1988; Neely, 2008), and the increased use of outsourcing (and off-shoring) IT development, call-centre functions and product development (Bhalla et al., 2008; Ellram et al., 2008). The importance of supply chain management (SCM) further highlights the importance of business service in creating value and developing long-term relationship (Yang et al., 2006; Prakash, 2014). Suppliers are being asked to take on greater responsibilities, as manufacturers increase their reliance on suppliers (Evans and Lindsay, 2005; Garengo and Panizzolo, 2013). This makes suppliers' business service quality become a key source of competitive advantage (Simpson et al., 2002; Azadegan, 2011). Nowadays, collaboration with suppliers and even competitors is increasingly important to a manufacturer's business strategy. However, due to the complex features of business service, suppliers are facing significant challenges in providing service effectively and developing further business collaboration.

Among other factors, information and communication technologies (ICTs) play a critical role in managing business service quality. The development of ICTs has further been deemed to offer opportunities to provide various e-business services (EBS) (e.g. see Avlonitis and Karayanni, 2000; Danese, 2007). However, there is limited literature on buyers' EBS requirements and the influence of these requirements on further business collaboration. Indeed, ICTs make it easier for buyers to search for an alternative supplier, and more importantly, lead to high buyers' expectations of their suppliers' service quality. According to Chen et al. (2004), how to meet buyers' EBS requirements effectively by

implementing ICTs is critical for both suppliers and buyers in order to create maximum value and to develop strategic relationship. This paper thus attempts to: 1) identify buyers' EBS requirements for their suppliers; 2) understand the influence of ICTs applications on EBS requirements; and 3) investigate the impact of EBS requirements on buyers and suppliers business collaboration. The rest of this paper is presented in five sections. Following a review of relevant literature in Section 2, Section 3 presents research methodology. The data analysis is provided in Section 4, while Section 5 discusses the findings and implications for both researchers and practitioners. Finally, Section 6 provides a summary and suggestions for further research.

2. Literature Review and Hypothesis Development

EBS comprises all information-based interactivities between the buyer and the supplier via ICTs that lead to the completion of business transactions (Vergidis et al., 2008; Yang et al., 2010). With the rapid development of ICTs, both researchers and practitioners have focused on how business services can be used strategically in electronic commerce (e.g. see Bolton et al., 2003; Rosenzweig and Roth, 2007; Oliveira and Roth, 2012). However, due to the complexity of business services and ICTs, there are few clearly defined and tangible cues for EBS. Little is known about the operations and capabilities needed for provision of EBS (Oliveira and Roth, 2012). The supplier thus has great difficulties in providing EBS effectively. The complexity of EBS requirements can be further explained using a gap model. In view of the elusive and indistinct nature of service quality, Parasuraman *et al.* (1985) developed a service quality model to measure the differences between expectations and perceptions of the actual business-to-customer service. Building on this gap model, four gaps between a buyer and a supplier can be highlighted for current ICT-focused environment (see Figure 1): Gap 1 is between a buyer's expected service and a supplier's understanding of the buyer's expectations. Gap 2 is between the supplier's understanding and the supplier's actual service offering. Gap 3 is between the supplier's actual service offering and the buyer's perceived service. Gap 4 is between the buyer's perceived service and its expected service. While Gap 2 and Gap 4 are services within the buyer and the supplier internally, Gap 1 and Gap 3 are services traversing the boundaries between the buyer and the supplier. Also, Gap 1 is an understanding gap, which is an initial step for the supplier to provide the service as the buyer has expected.

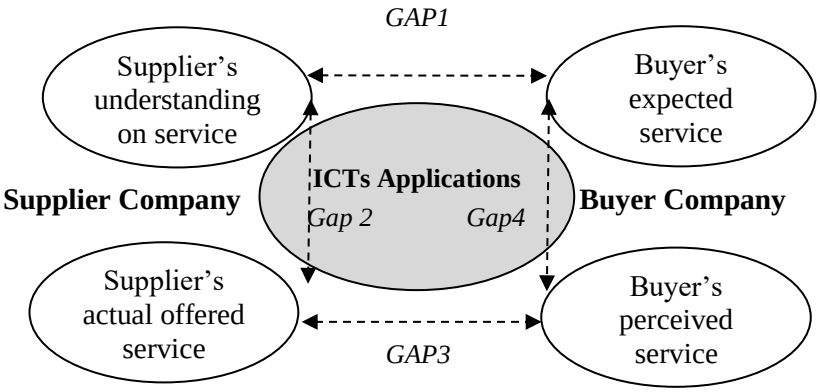

Figure 1 E-business service gaps model (adapted from Parasuraman et al., 1985)

The application of ICTs has offered opportunities to provide various EBS (e.g. Avlonitis and Karayanni, 2000; Danese, 2007), thus transforming the inter-organisational business processes and even creating entirely new business models (Bartezzaghi and Ronchi 2005; Wiengarten et al., 2013). The resultant increased information visibility has also reduced Gap 1 and Gap 3 in Figure 1. However, many companies have difficulty in leveraging this in their EBS, where in many cases the services provided by the supplier do not meet the buyer's expectations (Yang et al., 2010). To address this, the suppliers need to have a better understanding on the buyers' service requirements and utilise the appropriate ICTs to provide them effectively. In fact, understanding EBS requirements and reducing Gap 1 is the first step for the suppliers to identify more opportunities and design services within time and cost constraints and satisfy the buyer effectively (Nordin, 2008). It is essential for the suppliers to identify the buyers' expectations and then match their business performance with the buyers' requirements. The understanding of buyers' requirements is also critical for continuous process improvement and business process re-engineering (Hammer, 1990; Vergidis et al., 2008).

2.1. Impact of ICTs on E-Business Service

ICTs are a combination of technologies, applications, processes, business strategies and practices necessary to do business electronically (Johnson and Whang, 2002; Cagliano et

al., 2003). They can take different forms, such as web-based interfaces, internal information systems, business transaction systems and e-marketplaces. ICTs provide a platform to communicate large volume and complex information, for example B2B private Ethernet and Electronic Point of Sale (EPOS). Since 1980s, various ICTs such as bar-coding, EDI, MRP and ERP have been adopted to share real-time information between supply chain partners (e.g. on delivery status, production planning, inventory level and new product design) (Anderson et al., 1997; Auramo et al., 2005). ICTs also facilitate joint decision making and allow better inter-organisational coordination including sourcing, procurement, and order fulfilment (Kehoe and Boughton, 2001; Chen and Paulraj, 2004).

ICTs have been widely recognised to help short-term business partners to gather, store, analyse and manipulate information, speed up single transactions or integrate complex business interactivities and support functional integrations (Cagliano et al., 2003). ICTs applications allow buyers and suppliers to apply more effective practices and provide buyers and suppliers with continuous interactivities and further develop collaboration towards tighter integration (Vakharia, 2002; Adebanjo and Laosirihongthong, 2014). ICTs also enable a shared understanding of the inter-organisational interactions by providing a set of specifications. Anderson et al. (1997) point out that it is necessary to develop an ICT strategy between buyers and suppliers that supports multiple levels of decision making and gives a clear view of the flow of products, services, and information. However, while offering opportunities for new forms of service and transactions between organisations (Evans and Wurster, 1997), ICTs applications have brought a new set of challenges to both the supplier and the buyer, e.g. in tracking or further improving EBS (Yang et al., 2010). They have compelled organisations to examine their strategies and adapt their ways of undertaking business. Danese (2007) further points out that ICTs are particularly important when business partners come to design a collaboration process, and activate different supply chain activities. Fragmented ICTs applications constrain information flow and activity coordination between a company and its business partners (Barua et al., 2004). Within a supply chain context, this goes beyond the operability between business partners using different ICTs applications. For example, a company's ICTs-based platform should provide the capability to generate supply chain-wide visibility of processes and coordinate supplier- and customer-facing processes with its

internal organisational processes (Rai et al., 2006). In this context, the applications of ICTs may become an additional criterion for supplier selection. Also, high environmental uncertainty requires the greater information processing capabilities of a relationship, which, in turn, calls for the grater intensity and scope of the use of ICTs applications between the buyer and the supplier (Bensaou and Venkatraman, 1995). Along these lines, we propose:

Hypothesis 1: Buyers' ICTs applications influence their EBS requirements.

2.2. E-Business Service and Supplier Importance

While the advantage of long term relationships has been well researched, Goffin et al. (2006) point out that much of the literature has implied that a long-term relationship is desirable without proper consideration of the contextual factors influencing its effectiveness. Cox (2004) supports this, arguing that collaboration is not a panacea for the whole of the supplier base. The buyer should manage its supplier base as a portfolio of different types of suppliers (Petroni and Panciroli, 2002). This viewpoint is supported by transaction costs theory, which holds that buyers and suppliers have two basic alternatives to consider – market transactions versus hierarchy transactions in order to economise their transaction costs (Williamson, 1975; Croom, 2005). If transaction costs are high, the buyers tend to choose integration and control transaction processes by close supervision with a long-term business relationship or partnership. If the transaction has no specific investments involved then a short-term business relationship will be preferred. In addition, contingency theory also supports this point of view (Skinner, 1969). Contingency theory is based on the assumption of matching organisational resources with the corresponding environmental context and a belief that there is no universal set of choices that is optimal for all businesses (Gingsberg and Venkatraman, 1985). That is, different business relationships could help business organisation achieve different objectives.

Buyer-supplier relationships may also be classified according to the ability to absorb the information from business partners to achieve short-term operational efficiency and/or longer-term new knowledge creation (Malhotra et al., 2005). This is particularly relevant to EBS which emphasises the effectiveness of ICTs-supported inter-

organisational partnerships. For example, the quality of EBS may be constrained by the partner interface-directed information system, which influences the company's ability to acquire, assimilate and transform rich information from its partners. New knowledge creation can be observed in the form of new products and services, and new ways to make or deliver products and services. That is, it is pursued to achieve long-term competitiveness in conjunction with its business partners. Mutual adjustment would also be expected to be oriented towards such partnerships (Bensaou and Venkatraman, 1995). The results from relationship-specific investments may also be realised over a long period of time.

Based on the above discussions, we would expect that a buyer has different EBS requirements for its more important suppliers (with higher volume purchasing, and a longer-term relationship) from its less important suppliers. We thus hypothesise:

Hypothesis 2: A buyer's EBS requirements vary with service types of supplier (i.e. more or less important suppliers).

2.3. E-Business Service and Business Collaboration

Business collaboration is a long-term partnership where the parties work together, share information, resources and risks, and make joint decisions to accomplish mutual beneficial outcomes (Bowersox et al., 2003 and Lehoux et al., 2014). Indeed, companies are increasingly developing collaborative relationships (van de Vijver et al., 2011). Dyer and Hatch (2006) have shown the kind of competitive advantage that can be created by looking at the collaborative relationships between Toyota and its network of suppliers. The importance of managing and developing collaborative buyer-supplier relationships has particularly been stressed in the SCM literature (e.g. Harland, 1996; Stank et al., 2001; Lee et al., 2000). Studies have elaborated on the critical role of ICTs in supply chain efforts to manage supply chain activities and partnerships (e.g. Avlonitis and Karayanni 2000; Hill and Scudder, 2002; Devaraj et al., 2007; Rai et al., 2006). For example, cooperative and collaborative efforts (through a high level of information exchange enabled by Web technologies and portals for customers and suppliers) between supply chain partners have been suggested as critical to improved coordination of allocated

resources and activities across the chain (Lee et al., 2000; Fynes et al., 2005; Rai et al., 2006; Lehoux et al., 2014).

It should be noted that buyer-supplier relationships require substantial resources (Dwyer et al., 1987; Storey et al., 2005) and are not always appropriate (Goffin et al., 2006). Companies may also utilise a mix of the various configurations across their portfolio of different relationships (Petroni and Panciroli, 2002). This is further complicated within an e-commerce environment where buyers and suppliers have become more visible. For example, spot-market transactions can provide an easy and cost effective access for alternative business partners, and thus create a challenge in maintaining a collaborative relationship (Vaaland and Heide, 2007). In practice, while ICTs are suggested to facilitate greater buyers and suppliers collaboration including SCM practices (Vakharia, 2002; Adebanjo and Laosirihongthong, 2014), it is not uncommon to see that many buyer-supplier relationships may not even go beyond the placing of order and its delivery particularly in commodity purchasing regardless of duration of relationships. In a broad context, Goffin et al. (2006) argue that the variety of conditions that lead to and affect collaborative relationships is not well understood. Here we are interested in the extent to which EBS influences buyer-supplier business relationship development. Within the e-business environment, the Gap 1 (in Figure 1) would be reduced for perceived experience and expertise and competence of suppliers. We would expect that the buyer can leverage this by setting certain EBS requirements, which could provide a basis for further collaborative relationship development. Accordingly, the supplier can determine the degree of commitment to meet the requirements. Stated differently,

Hypothesis 3: EBS requirements influence buyers and suppliers business collaboration.

In summary, Figure 2 presents our research framework, with the hypotheses we have proposed.

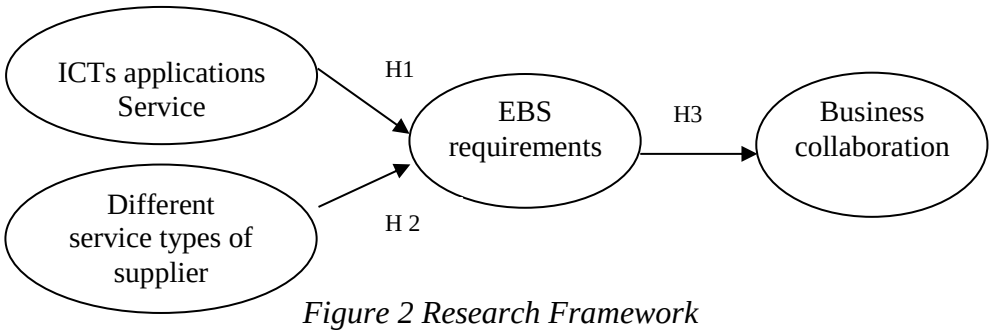

Figure 2 Research Framework

3. Methodology and Data Collection

A questionnaire survey was adopted for this research because it is deemed to be the most efficient way of reaching a large number of respondents. All close-ended questions were measured on a five-point Likert scale. In order to examine whether the questionnaire accomplished study objectives or prevented the inclusion of some obvious questions that might reveal avoidable ignorance of the investigator, the questionnaire was reviewed and pilot tested by academics and practitioners. All question items are based on the existing literature (e.g. Nurmilaakso, 2008; Stanworth, 2012). While there are different ways to classify different types of suppliers, such as the involvement in new product development, the importance in overall performance, and product categories (Zironpli and Caputo, 2002), in this paper the suppliers are divided into two groups- the more important suppliers (MIS) and the less important suppliers (LIS) according to the duration of their business relationships with the buyer and the volume of annual purchase.

The final survey instrument (see the Appendix) was sent to 500 UK Telecommunication manufacturers selected from online databases. The sample size was decided after considering the expected response rate, the requirements for performing statistical analysis and survey costs. The key reasons for selecting the telecommunication industry are its increasingly competitive business environment and the most complex and diverse business activities, which need high quality of EBS. In addition, telecommunication manufacturers take a leading position of ICTs applications to facilitate EBS (Yang et al., 2010). The target respondents for the survey were middle-

level operations/production/supply chain managers, who are in the best position to answer the questions of this survey because of their experience, expertise, and access to data.

4. Data Analysis

The data analysis in this research was carried out using the SPSS 11.5 for Windows including testing non-response bias, factor analysis, ANOVAs and cluster analysis. From 500 subjects in the target sample, a total of 128 responses were received. Of the 128, seven mailings were returned with incomplete answers. Of the remaining 372 potential respondents, 11 respondents had moved from their original locations and left no forwarding addresses, and three responses indicated not to participate; The final valid responses are 121 resulting in a response rate of 24.90% (121/486) which correlates favourably with other empirical studies cited (e.g. Powell, 1995). Participating companies vary greatly in terms of the number of employees, gross annual turnover, and the applications of ICTs (see Table 1 and 2), which well represent the industry.

Table 1 Company size

Characteristics		***Frequency***	***%***	***Characteristics***		***Frequency***	***%***
Number of employees	Less 100	55	45.45	Gross Annual Turnover (Million pounds)	Less 10	52	42.97
	101-500	52	42.97		11-50	50	41.32
	501-1000	12	9.92		501-100	12	9.92
	Over 1000	2	1.65		Over 100	4	3.30
	Total	121	100		Missing	3	2.48
					Total	121	100

Table 2 The applications of ICTs

Characteristics		***Frequency***	***%***
Main ICTs Applications with the suppliers	Brochure-type website for marketing purpose	96	79.34
	Online buying and selling function	47	38.84
	Partner-specific software	67	55.37
	E-marketplace	19	15.70
	Integrated information system	56	46.28

In order to assess potential non-response bias for this research, earlier and later waves of returned surveys were compared in accordance with the theory of Armstrong

and Overton (1977). Based on questionnaire returned times, two group data were formed by twenty respondents from earlier and later waves respectively. These two group data were compared in terms of number of employees and gross annual turnover by Chi-square analysis, and the length of their relationships and the purchase volumes by t-tests respectively. All the significance values are above 0.05 (ranging from 0.15 to 0.59 and from 0.65 to 0.95), which indicate that there are no statistically significant differences in the characteristics across earlier and later respondents. This gives added confidence to the view that the data obtained from the survey is representative of the population.

4.1. Hypothesis 1: Buyers' ICTs Applications and Their EBS Requirements

To determine whether there are different EBS requirements when the buyers apply different ICTs, we performed a cluster analysis. Both hierarchical and non-hierarchical cluster methods were used in the analysis as suggested by Hair et al. (1998) in order to cluster observations into groups. After the hierarchical analysis, a K-mean cluster analysis (a non-hierarchical clustering technique), of information related services (including brochure-type website for marketing purpose, online buying and selling function and e-marketplace) and collaboration related service (including integrated information system and partner-specific software) was performed. The results in Table 3 show that the 121 respondents were assigned to three clusters in the K-mean cluster analysis. To assess whether the means of the two factors were significantly different across the three clusters, Analysis of variance (one-way ANOVA) was performed. The results from the cluster analysis suggest that a buyer with different ICTs applications has different EBS requirements for their MIS. There are three types of ICT applications. The first type (n=16), labelled basic ICTs applications forwarders, accounts for 13.23% of the sample. The buyer with this type of ICTs applications has very low EBS requirements on information service requirements (mean< 2.0). 35.53% of the samples (n=43) are labelled e-marketplace applications. This group expects a medium level of requirements on information service and collaboration service (3.00<mean<3.20). Accounting for 51.23% of the sample, the largest of the ICT applications (n=62) is to apply specific software for their own companies and their business partners. The buyer with this type of ICTs applications is expecting very high EBS for both information (mean=4.14) and

collaboration (Mean=4.30). Their high expectations suggest that they are emphasising EBS, and require their supplier to provide a wide variety of EBS dimensions.

Table 3 ANOVA statistics and cluster means for MIS and LIS

Factors	***Cluster***			
	1 (n=16)	***2 (n=43)***	***3(n=62)***	***F***
MIS-information	*1.82*	*3.16*	*4.14*	*110.63*
MIS-collaboration	*4.02*	*3.12*	*4.30*	*62.57*
	1 (n=31)	***2 (n=36)***	***3(n=54)***	***F***
LIS-information	2.25	2.33	2.33	0.00
LIS-collaboration	2.15	2.52	2.44	1.91

The same methods have been applied to LIS, however the cluster mean difference is not significant in ANOVA test (see Table 3). That is, Hypothesis 1 is partially supported in this study.

4.2. Hypothesis 2: Service Types of Supplier and Buyers' EBS Requirements

To measure the different EBS requirements from MIS and LIS, there are eight variables developed along the inter-organisational business processes. The targets of the survey were requested to indicate, using a five-point Likert scale where 1=very low expectation and 5=very high expectation, the extent to which they expected EBS from their MIS and LIS on all eight dimensions. Table 4 summarises the results.

Table 4 Different service requirements from MIS and LIS

Variables	***MIS***	***Std.***	***LIS***	***Std.***
Effective and reliable delivery information	4.07	0.84	2.89	1.14
Easy communication	4.05	0.91	2.74	1.1
Further collaboration	3.89	0.96	2.21	1.06
Co-operative production and operations management	3.84	1.11	2.27	1.00
Flexible product attributes	3.67	1.02	2.30	0.94
Sharing inventory information	3.57	1.17	2.29	1.10
Access to information from website	3.48	1.17	2.38	1.24
Online order and payment	3.25	1.20	2.30	1.25

The independent t-test was applied to analyse the statistical difference between LIS and MIS for testing equal variance. P value (less than 0.05), while alpha value was set at 0.05, was considered as a statistically significant difference. The t test results in Table 5 indicate the buyers' different EBS requirements for MIS and LIS, which support Hypothesis 2.

Table 5 Different service requirements from MIS and LIS

Variables	***Mean difference***	***Std. De.***	***95% Confidence***		***t***	***Sig. (2-tailed)***
			Lower	Std. De.		
Effective and reliable delivery information	1.17	1.20	.96	1.39	10.74	.00
Easy communication	1.31	1.10	1.12	1.51	13.19	.00
Further collaboration	1.68	1.25	1.45	1.90	14.73	.00
Co-operative production and operations	1.57	1.31	1.33	1.80	13.06	.00
Flexible product attributes	1.37	1.15	1.17	1.58	13.14	.00
Sharing inventory information	1.28	1.47	1.01	1.54	9.52	.00
Access to information from website	1.10	1.65	.80	1.395	7.35	.00
Online order and payment	.95	1.46	.69	1.21	7.13	.00

In addition, we conducted a Principal Component Analysis to assess the dimensionality of the eight dimensions that underpin the EBS requirements for MIS and LIS respectively. The initial factors solution for MIS resulted in three factors with eigenvalues greater than unity. The three-factor solution for the eight dimensions accounted for 71.07% of the variance. To purify the list, dimensions with loadings of 0.50 or greater on more than one of the factors were eliminated. Table 6 shows a list of seven dimensions with a clear factor structure in two factors. These dimensions account for 62.19% of the variance and no dimensions have loadings of 0.50 or above in more than one factor. The table also shows a list of five dimensions for LIS with a clear factor structure in one factor, which account for 63.20% of the variance and no dimensions have loadings of 0.50 or above in more than one factor. The results of a reliability test also show that the derived factors are reliable.

The two identified factors are summarised as follows: Factor 1 – Information Service: it accounts for 22.18% of the total explained variance and is associated with such service elements as access to information from website, and online order and payment. Factor 2 – Collaboration Service: it accounts for 40.00% of the total explained variances

and consists of service elements relating to delivery, inventory, production, product design and further collaboration.

Table 6 Results of factor analysis for MIS and LIS

Variables	***MIS***				***LIS***		
	Factor		***Construct***	***Alpha***	***Factor***	***Construct***	***Alpha***
Access to information from website	0.32	**0.78**	62.19%	0.78			
Online order and payment	0.43	**0.71**					
Effective and reliable delivery information	**0.73**	0.21			**0.73**	63.20%	0.84
Sharing inventory information	**0.66**	0.12			**0.74**		
Co-operative production and operations	**0.72**	-0.37			**0.79**		
Flexible product attributes	**0.71**	-0.32			**0.81**		
Further collaboration	**0.74**	-0.38			**0.83**		

4.3. Hypothesis 3: The Impact of EBS Requirements on Business Collaboration

To determine if the buyer's EBS requirements influence future buyer-supplier business relationship development, the target respondents were requested to rate on a five-point Likert scale (where 1 = very low and 5 = very high). Table 7 and Table 8 show that their expectations on eight dimensions are spanning differently.

Table 7 Factor analysis for EBS requirements for business relationship collaboration

Variables	***MIS***				***LIS***			
	Mea	***F.A.***	***Alph***	***Construct***	***Mea***	***F.A.***	***Alpha***	***Construct***
There is a strong sense of loyalty to them	3.85	0.75	0.89	70.94%	2.44	0.76	0.87	68.49%
Believe the relationship with them is profitable	4.19	0.66			2.72	0.62		
View the relationship as a long-term alliance	4.35	0.73			2.38	0.78		
Willing to make investments in this relationship	4.06	0.88			2.20	0.86		
Willing to provide information they need	4.17	0.80			2.77	0.54		
Participate in joint planning and training sessions	3.55	0.75			2.06	0.79		
Involve them in new product development	3.92	0.75			2.24	0.76		
Share risks	3.41	0.68			1.94	0.73		

Table 8 Difference of business relationship expectations for MIS and LIS

Variables	**Mean**	**Std. Deviation**	**95% Confidence Interval of the Difference**		***t***	**Sig.**
			Lower	Upper		
There is a strong sense of loyalty to them	*1.41*	*1.26*	*1.18*	*1.64*	*12.11*	*0.00*
Believe the relationship with them is profitable	1.47	1.11	1.26	1.67	14.39	0.00
View the relationship as a long-term alliance	1.97	1.21	1.75	2.19	17.62	0.00
Willing to make investments in this relationship	1.86	1.14	1.66	2.07	17.78	0.00
Willing to provide information they need	1.40	1.06	1.21	1.59	14.40	0.00
Participate in joint planning and training sessions	1.49	1.14	1.28	1.70	14.24	0.00
Involve them in new product development	1.68	1.25	1.45	.191	14.54	0.00
Share risks	1.47	1.20	1.25	1.69	13.24	0.00

A one-way analysis of variance (ANOVA) was performed to examine if differences exist between the mean values of the eight dimensions in each of the three types of MIS and LIS. The responses have clearly shown their different service requirements for MIS and LIS. The ANOVA results in Table 9 indicate that significant differences existed in all of the eight dimensions for all types of MIS and LIS groups. In sum, MIS appears to have higher expectation (3.32<mean<4.48) on business collaboration than LIS does (1.93<mean<2.97). The buyer has the highest expectation for their MIS on "view the relationship as a long-term" for Group 3 (mean=4.48), and followed by "believe the relationship with them is profitable" for Group 2 (mean=4.31). The first group of LIS is found to have the lowest level of "share risks" (mean = 1.93). The services requirements for MIS on business collaboration were further tested using linear regression. Linearity and equality of variables were assessed and confirmed through plotting the standardised residuals against the standardised predicted values. The correlation coefficients are above threshold of 0.70. R^2 is 0.68 at the significance level of 0.021.

Table 9 ANOVA statistics and cluster means for business relationship development

Variables	***MIS***			***LIS***		
	1 (n=21)	**2 (n=48)**	**3 (n=52)**	**1 (n=29)**	**2 (n=35)**	**3 (n=54)**
There is a strong sense of loyalty to them	*3.74*	*3.86*	*3.91*	*2.14*	*2.74*	*2.48*
Believe the relationship with them is profitable	4.03	4.31	4.20	2.83	2.89	2.56
View the relationship as a long-term alliance	4.19	4.28	4.48	2.14	2.57	2.46
Willing to make investments in this relationship	3.74	4.17	4.17	2.03	2.29	2.28
Willing to provide information they need	3.94	4.25	4.24	2.97	2.71	2.78
Participate in joint planning and training	3.32	3.64	3.63	2.00	2.14	2.13
Involve them in new product development	3.77	4.03	3.93	2.07	2.29	2.39
Share risks	3.32	3.50	3.41	1.93	2.09	1.94

5. Research Findings and Implications

Despite the recognition of the importance of EBS in literature, it is less clear what are the buyers' EBS requirements and their impact on business relationship development. Data collected for this research show that buyers' ICTs applications influence their EBS requirements for their MIS, but not LIS. That is, Hypothesis 1 is partially supported. One possible explanation for this lack of finding (in terms of LIS) is that great ICTs usage intensity in the telecommunication industry would enable the manufacturer to establish electronic links with a large number of potential suppliers, and gather market intelligence and explore alternative sources of supply through instant and efficient access (Zhu and Kraemer, 2005). It is thus common for the manufacturer to enhance sourcing leverage over its LIS (Saeed et al., 2005). As a result, the influence of buyers' ICTs applications on their EBS requirements may not be significant. By contrast, in a relationship involving MIS, both the buyer and the suppler are required to make significant relationship-specific investments (e.g. in physical and human assets) (Azadegan, 2011; Krause and Ellram, 2014). These relational investments enable them to become more aware of each other's culture, work habits and technological sophistication (Azadegan, 2011). Our findings further reveal that, by examining the relationship between the buyer's ICTs applications and EBS, the supplier can direct its activities to better fitting the needs and expectations of the buyer. Indeed, the literature has largely ignored the role of an organisation's business partners' ICTs applications in the value creation process (Barua et al., 2004). Our findings also lend support to the importance of specific ICTs applications for buyer-supplier collaboration (Wiengarten et al., 2013).

The data analysis further supports Hypothesis 2, which suggests that, based on the business relationship duration and the purchasing volume with the suppliers, the buyers have different service requirements on service types of suppliers. In general, the buyer has higher expectations for MIS than LIS. These findings are unsurprising, given that in today's business environment, increasingly the buyer's satisfaction in a long-term, collaborative buyer-supplier relationship does not merely depend upon reliable deliveries of actual goods or the flow of goods transactions (Goffin et al., 2006; Azadegan, 2011). For suppliers, the implication is that they should analyse how important their relationship is to each individual customer (buyer), which can then provide guidance on the design for the supplier's ICTs applications. This reinforces Oliveira and Roth (2012), who argue

that, for EBS, ICTs applications must be developed to facilitate different business customer relationships. It is also in line with Schultze and Orlikowski (2004), who state that embedded relationships with customers are key in generating repeat business and economic advantage especially in B2B settings. Meeting the buyers' different EBS requirements also implies a service orientation. The capabilities of ICTs applications are not sufficient to guarantee successful EBS (Oliveira and Roth, 2012). In this context, our findings are also useful for the growing number of manufacturers that aspire for differentiation through services (Neely, 2008). While the literature has well documented the various compelling reasons for manufacturers to undertake servitisation (e.g. Schmenner, 2009; Dachs . 1., 2014; Baines and Shi, 2015), many manufacturers who invest substantially in growing their service business often do not achieve the strategic and financial benefits that they would expect (e.g. Neely, 2008; Benedettini . 1., 2015). For example, Brown . 1. (2009) report that many B2B manufacturers are unprepared when they make the move into new territory, and fall into a number of traps such as introducing the services the wrong way. To address the challenges of servitisation from a buyer-supplier dyadic perspective, Kreye . 1. (2015) examine the relationship between service complexity and the development of contractual and relational capabilities required to offer servitisation. Spring and Araujo (2013) contend that, in a manufacturing-oriented supply network, a manufacturer's service offering is not only determined by its own production capabilities but also its capabilities to orchestrate and access its network partners' capabilities. In accordance with our results, suppliers are well advised to focus on different dimensions of EBS based on their business relationships with individual buyers, as well as the buyers' ICTs applications.

Hypothesis 3 is also statistically supported in this study. That is, buyers' EBS requirements influence further buyers and suppliers business collaboration. Our findings shed some light on the capabilities required by both buyers and suppliers engaged in EBS to be successful. Buyers have different expectations on business collaboration for MIS and LIS. Setting appropriate EBS requirements is not only an effective means of ensuring that suppliers are performing as expected, but also developing supplier selection criteria for future collaboration. Building on this, buyers should identify or create contexts proactively in their supplier development efforts that can support their future business collaboration. In the context of EBS, this extends work by Barua . 1. (2001), which suggests that business customers can directly affect the set of abilities required for a

company to deliver B2B services effectively. Our results indicate that meeting buyers' EBS requirements is increasingly important in developing further collaborative relationships. With the increasing focus on buyers' EBS requirements, we again emphasise the importance of a service-orientation in the effective delivery of B2B e-services, which has received very limited attention in literature (Oliveira and Roth, 2012). This is also emphasised by Weddle and Bullukian (2004), who found that most failures of B2B projects were related to the fact that stakeholders had a "technology-only view" of B2B implementations. In addition, as the supplier increasingly outsources the provision of some EBS to professional service providers, such as marketing service and logistics service specialist companies, a common interpretation of EBS dimensions needs to be defined among the supplier, the buyer and service providers. This is particularly true when there are multiple service intermediaries. The large number of intermediary roles might complicate transactions between parties. The need for a common interpretation of business service dimensions is also relevant for co-produced B2B servitisation (Raddats and Easingwood, 2010 and Löfberg et al., 2015). Servitising manufacturers may outsource some servicing to an independent service provider, due to the complexity, risk and cost of providing through-life services for their own products, or involving taking over an end-user's entire process.

6. Conclusion and Further Research

The primary purpose of this study has attempted to understand the buyer's different EBS requirements and the factors influencing the buyer's requirements, and investigate the impact of EBSs requirements on future business relationship. Based on a questionnaire survey with UK telecommunication manufacturers, this research reveals that the types of supplier and the buyers' ICTs applications influence the buyer's EBS requirements, which also impact the buyer and supplier future relationship development. The findings here not only help suppliers to understand which service dimensions can meet the buyer's demands, but also assist buyers in their supplier development efforts to improve their future relationship.

It should be noted that certain characteristics of this research could be seen as limitations and thus provide extensions for future exploration. Firstly, this research is part

of a wider program of research on EBS with the application of ICTs, which focused on inter-organisational business processes. There is a further need to investigate the extent to which ICTs influence EBS requirements and EBS requirements influence further relationship development. Secondly, Hypothesis 1 is partially supported. In addition to the ICTs intensity usage we discussed, there may be other contextual factors affecting the influence of buyers' ICTs applications on their EBS requirements for their LIS. Further research is needed to shed more light on this. Furthermore, the generalisability of our findings to other industry sectors requires further investigation. Further research could test our hypotheses using data from two distinct industry segments (e.g. low-tech and high-tech in tandem). Additionally, our study is limited in its ability to examine the development of a buyer-supplier relationship over time and constrain our capability to fully examine the dynamic nature of the relationship. Longitudinal data are needed to uncover all the dynamics of this complex relationship. Finally, our questionnaire was aimed at buyers only. The literature recognises that the buyer and the supplier have different expectations and perceptions about their business partnerships, and different requirements from their business partners (e.g. Nyaga et al., 2010; Krause and Ellram, 2014). A dyadic approach including the supplier's view would lead to further insights.

Reference

Anderson, D. L., F. E. Britt and D. J. Favre. 1997. "The seven principles of Supply Chain Management, Logistics Management." *Supply Chain Management Review* April.

Adebanjo, D. and T. Laosirihongthong. 2014. "Adoption of web-based order-processing systems: experiences from tier-1 suppliers in the automotive supply chain." *Production Planning & Control* 25 (15): 1287-1301.

Armstrong, J. S. and T. Overton. 1977. "Estimating non-response bias in mail surveys." *Journal of Marketing Research* 24: 396-402.

Auramo, J., K. Jouni and T. Kari. 2005. "Benefits of IT in Supply Chain Management: An explorative study of progressive companies." *International Journal of Physical Distribution and Logistics Management* 35(2): 82 -100.

Avlonitis, G. J. and D. A. Karayanni. 2000. "The impact of internet use on business-to-business marketing." *Industrial Marketing Management* 29 (5): 441-459.

Azadegan, A. 2011. "Benefiting from supplier operational innovativeness: the influence of supplier evaluations and absorptive capacity." *Journal of Supply Chain Management* 47 (2): 49-64.

Baines, T. and V. G. Shi. 2015. “A Delphi study to explore the adoption of servitization in UK companies.” *Production Planning & Control* 26 (14-15): 1171-1187.

Bartezzaghi, E. and S. Ronchi. 2005. “E-sourcing in a buyer-operator-seller perspective: benefits and criticalities.” *Production Planning & Control* 16 (4): 405-412.

Barua, A., P. Konana, A. B. Whinston and F. Yin. 2001. “Driving e-business excellence.” *Sloan Management Review* 43 (1): 36-44.

Barua, A., P. Konana, A. B. Whinston and F. Yin. 2004. “Assessing net-enabled business value: An exploratory analysis.” *MIS Quarterly* 28 (4): 585-620.

Benedettini, O., A. Neely, and S. Morgan. 2015. “Why do servitized firms fail? A risk-based explanation.” *International Journal of Operations & Production Management* 35 (6): 946-979.

Bensaou, M. and N. Venkatraman. 1995. “Configurations of interorganizational relationships: a comparison between US and Japanese automakers.” *Management Science* 41 (9): 1471-1492.

Bhalla, A., M., M. Sodhi and B. G. Son. 2008. “Is more IT offshoring better? An exploratory study of western companies offshoring to South East Asia.” *Journal of Operations Management* 26 (2): 322-335.

Bolton, R. N., Smith, A., K. and Wagner, J. 2003. “Striking the right balance*:* Designing service to enhance business-to-business relationships.” *Journal of Service Research* 5 (4): 271-291.

Bowersox, D., D. Closs, and T. Stank. 2003. *“*How to master cross-enterprise collaboration.” *Supply Chain Management Review* 7 (4): 18-27.

Brown, S. W., A. Gustafsson and L. Witell. 2009. “Beyond products.” *Wall Street Journal* June 22: R7–R8.

Cagliano, R., F. Caniato and G. Spina. 2003. “E-business strategy: How companies are shaping their supply chain through the Internet.” *International Journal of Operations & Production Management* 23 (10): 1142-1162.

Chen, I and A. Paulraj. 2004. Towards a theory of supply chain management: the constructs and measurements, *Journal of Operations Management* 22 (2): 119–150

Chen, I. J., A. Paulraj and A. A. Lado. 2004. “Strategic purchasing supply management and firm performance.” *Journal of Operations Management* 22 (5): 505-523.

Cox, A. 2004. “The art of the possible: relationship management in power regimes and supply chains.” *Supply Chain Management: An International Journal* 9 (5): 346-356.

Croom, S. R. 2005. “The impact of e-business on supply chain management: an empirical study of key developments.” *International Journal of Operations & Production Management* 25 (1): 55-73.

Dachs, B., S. Biege, M. Borowiecki, G. Lay, A. Jäger and D. Schartinger. 2014. “Servitisation of European manufacturing industries: empirical evidence from a large-scale database.” *The Service Industries Journal* 34 (1): 5-23.

Danese, P. 2007. “Collaboration forms, information and communication technologies, and coordination mechanisms in CPFR.” *International Journal of Production Research* 27 (2): 181-204.

Devaraj, S., L. Krajewski and J. Wei. 2007. “Impact of e-business technologies on operational performance: the role of production information integration in the supply chain.” *Journal of Operations Management* 25 (6): 1199-1216.

Dwyer, R. F., P. H. Schurr and S. Oh. 1987. “Developing buyer–seller relationship.” *Journal of Marketing* 51 (2): 11–27.

Dyer, J. H. and N. W. Hatch. 2006. “Relation-specific capabilities and barriers to knowledge transfers: Creating advantage through network relationships.” *Strategic Management Journal* 27 (8): 701-719.

Ellram, L. M., W. L. Tate, and C. Billington. 2008. “Understanding professional services outsourcing and offshoring.” *Journal of Operations Management* 26 (2): 148-163.

Evans, J. R. and W. M. Lindsay. 2005. *The Management and Control of Quality*. South-western, Mason, OH.

Evans, P. B. and T. S. Wurster. 1997. “Strategy and the new economics of information.” *Harvard Business Review* 75 (5): 71-82.

Fynes, B., S. Burca and C. Voss. 2005. “Supply chain relationship quality, the competitive environment and performance.” *International Journal of Production Research* 43 (16): 3303-3320.

Garengo, P. and R. Panizzolo. 2013. “Supplier involvement in integrated product development: evidence from a group of Italian SMEs.” *Production Planning & Control* 24 (2-3): 158-171.

Gingsberg, A. and N. Venkatraman. 1985. “Contingency perspectives of organisational strategy: a critical review of the empirical research.” *Academic Management Review* 10: 421-434.

Goffin, K., F. Lemke and M. Szwejczewski. 2006. “An exploratory study of ‘close’ supplier-manufacturer relationships.” *Journal of Operations Management* 24 (2): 189-209.

Hair, J. F., Anderson, R. E., Tatham, R. L. and Black, W. C. 1998. *Multivariate data analysis. (Fifth ed.)*, Prentice-Hall, New Jersey.

Hammer, M. 1990. “Re-engineering work: don’t automate, obliterate.” *Harvard Business Review* 68 (4): 104-112.

Harland, C. M. 1996. “Supply chain management: relationships, chains and networks.” *British Journal of Management* 7: 63-80.

Hill, C. and G. Scudder. 2002. “The use of electronic data interchange for supply chain coordination in the food industry.” *Journal of Operations Management* 20 (4): 375-387.

Johnson, M. E. and S. Whang. 2002. “E-business and supply chain management: an overview and framework.” *Production and Operations Management* 11 (4): 413-423.

Kehoe D.F and N.J Boughton. 2001. “New paradigms in planning and control across manufacturing supply chains.” *International Journal of Operations & Production Management* 21 (5/6): 582–593.

Krause, D. and L. M. Ellram. 2014. “The effects of the economic downturn on interdependent buyer-supplier relationships.” *Journal of Business Logistics* 35 (3): 191-212.

Kreye, M. E., J. K. Roehrich and M. A. Lewis. 2015. “Servitising manufacturers: the impact of service complexity and contractual and relational capabilities.” *Production Planning & Control* 26 (14-15): 1233-1246.

Lee, H. L., K. C. So, and C. S. Tang. 2000. “The value of information sharing in a two-level supply chain.” *Management Science* 46 (5): 626-643.

Lehoux, N., S. D’Amours, and A. Langevin. 2014. “Inter-firm collaborations and supply chain coordination: review of key elements and case study.” *Production Planning & Control* 25 (10), 858-872.

Löfberg, N., L. Witell and A. Gustafsson. 2015. “Service manoeuvres to overcome challenges of servitisation in a value network.” *Production Planning & Control* 26 (14-15):1188-1197.

Malhotra, A., S. Gasain and O. Sawy. 2005. “Absorptive capacity configurations in supply chains: gearing for partner-enabled market knowledge creation.” *MIS Quarterly* 29 (1): 145-187.

Neely, A. 2008. “Exploring the financial consequences of the servitization of manufacturing.” *Operations Management Research* 1 (2): 103-118.

Nordin, F. 2008. “Linkages between service sourcing decisions and competitive advantage: A review, propositions, and illustrating cases.” *International Journal of Production Economics* 114 (1): 40-55.

Nurmilaakso, J. 2008. “Adoption of e-business functions and migration from EDI-based to XML-based e-business frameworks in supply chain integration.” *International Journal of Production Economics* 113 (2): 721–733

Nyaga, G., Whipple, J. and Lynch, D. 2010. “Examining supply chain relationships: do buyer and supplier perspectives on collaborative relationships differ?” *Journal of Operations Management* 28(2):101-114.

Oliveira, P. and A. V. Roth. 2012, “The influence of service orientation on B2B e-Service capabilities: An empirical investigation.” *Production and Operations Management* 21 (3): 423-443.

Parasuraman, A., V. A. Zeithaml, and L. L. Berry. 1985. “A conceptual model of service quality and its implications for future research.” *Journal of Marketing* 49 (3): 41-50.

Petroni, A. and B. Panciroli. 2002. “Innovation as a determinant of suppliers' roles and performances; an empirical study in the food machinery industry.” *European Journal of Purchasing and Supply Management* 8: 135-145.

Powell, T.C. 1995. “Total quality management as competitive advantage: a review and empirical study.” *Strategic Management Study*16: 15-37.

Prakash, G. 2014. “QoS in the internal supply chain: the next lever of competitive advantage and organisational performance.” *Production Planning & Control* 25 (7): 572-591.

Raddats, C. and C. Easingwood. 2010. “Services growth options for B2B product-centric businesses.” *Industrial Marketing Management* 39 (8): 1334-1345.

Rai, A., R. Patnayakuni and N. Seth. 2006. “Firm performance impacts of digitally enabled supply chain integration capabilities.” *MIS Quarterly* 30 (2): 225-246.

Rosenzweig, E. and A. V. Roth. 2007. “B2B seller competence*:* Construct development and measurement using a supply chain strategy lens.” *Journal Operations Management* 25 (6): 1311-1331.

Saeed, K. A., M. K. Malhotra and V. Grover. 2005. “Examining the impact of interorganizational systems on process efficiency and sourcing leverage in buyer-supplier dyads.” *Decision Sciences* 36 (3): 365-396.

Schmenner, R. W. 2009. “Manufacturing, service, and their integration: some history and theory.” *International Journal of Operations & Production Management* 29 (5): 431-443.

Schultze, U. and W. J. Orlikowski. 2004. “Practice perspective on technology-mediated network relations: The use of internet-based self-serve technologies.” *Information Systems Research* 15(1): 87-106.

Simpson, P. M., J. A. Siguaw and S. C. White. 2002. “Measuring the performance of suppliers: an analysis of evaluation processes.” *Journal of Supply Chain Management* 38 (1): 29-32.

Skinner, W. 1969. “Manufacturing -missing link in corporate strategy.” *Harvard Business Review* 47 (4): 136-145.

Spring, M. and L. Araujo. 2013. “Beyond the service factory: service innovation in manufacturing supply networks.” *Industrial Marketing Management* 42 (1): 59-70.

Stank, T.P., S.B. Keller and P.J. Daugherty. 2001. “Supply chain collaboration and logistical service performance.” *Journal of Business Logistics* 22 (1): 29-47.

Stanworth, J. O. 2012. “Deep supply relationships: influencing outcomes by managing supply service quality.” *Production Planning & Control* 23(7): 541-552

Storey, J., C. Emberson and D. Reade. 2005. “The barriers to customer responsive supply chain management.” *International Journal of Operations & Production Management* 25 (3): 242-260.

Vaaland, T. I. and M. Heide. 2007. “Can the SME survive the supply chain challenges?” *Supply Chain Management: An International Journal* 12 (1): 20-31.

Vakharia, A. J. 2002. “E-business and supply chain management.” *Decision Sciences* 33 (4): 495-504.

van de Vijver, M., B. Vos, and H. Akkermans. 2011. “A tale of two partnerships: Socialization in the development of buyer-supplier relationships.” *Journal of Supply Chain Management* 47 (4): 23-41.

Vandermerwe, S. and J. Rada. 1988. “Servitization of business: adding value by adding services.” *European Management Journal* 6 (4): 314-324.

Vergidis, K., C. J. Turner and A. Tiwari. 2008. “Business process perspectives: Theoretical developments vs. real-world practice.” *International Journal of Production Economics* 114 (1): 91-104.

Weddle, R. and J. M. Bullukian. 2004. “The promise of B2B.” *Cap Gemini Ernst & Young Report* 15-24.

Wiengarten, F., P. Humphreys, A. McKittrick and B. Fynes. 2013. “Investigating the impact of e-business applications on supply chain collaboration in the German automotive industry.” *International Journal of Operations & Production Management* 33 (1): 25-48.

Williamson, O. E. 1975. *Markets and hierarchies: analysis and antitrust implications,* NY Free Press.

Yang, Y., P. Humphreys and R. McIvor. 2006. “Business service quality dimensions in an e-commerce environment.” *Supply Chain Management: an International Journal* 11 (3): 195-201.

Yang, Y., P. Humphreys, R. McIvor and B. Yang. 2010. “E-business services and business performance: a study of the telecommunications manufacturing industry.” *Production Planning and Control* 21 (5): 496-507.

Zhu, K. and K. Kraemer. 2005. "Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry." *Information Systems Research* 16 (1): 61-84.

Zironpli, F. and M. Caputo. 2002. "The nature of buyer–supplier relationships in co-design activities: the Italian auto industry case." *International Journal of Production and Operations Management* 22 (12): 1389-1410

Appendix - Questionnaire questions

Please answer the following questions as they relate to you.
1. What is the number of employees at your firm?
a) Less 100 □ b) 100 - 499 □ c) 500 - 1000 □ d) More than 1000 □
2. Turnover and sales revenue in a year? (in million)
a) Less than 10 □ b) 10-49 □ c) 50-100 □ d) More than 100
3. What is your job position?
a) CEO/Managing director □ b) General Manager □ c) Buyer/Sales manager □
d) Purchasing/Procurement/Supply manager □ e) others □
4. How many years have you been in your current position?
a) 0-5 □ b) 6-10 □ c) 11-20 □ d) 21- 30 □ f) 30 above □

MI supplier					***ICTs Applications***	LI supplier				
Strong disagree 1	2	neutral 3	4	Strong agree 5		Strong disagree 1	2	neutral 3	4	Strong agree 5
☐	☐	☐	☐	☐	Brochure-type website	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Online buying and selling function	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Partner-specific software	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	E-marketplace	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Integrated information system	☐	☐	☐	☐	☐

MI supplier					***E- business Services requirements***	LI supplier				
Strong disagree 1	2	neutral 3	4	Strong agree 5		Strong disagree 1	2	neutral 3	4	Strong agree 5
☐	☐	☐	☐	☐	Effective and reliable delivery information	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Easy communication	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Further collaboration	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Co-operative production and operations management	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Flexible product attributes	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Sharing inventory information	☐	☐	☐	☐	☐
☐	☐	☐	☐	☐	Access to information from website	☐	☐	☐	☐	☐

☐ ☐ ☐ ☐ ☐	Online order and payment	☐ ☐ ☐ ☐ ☐

MI supplier Strong disagree neutral Strong agree 1 2 3 4 5	***Business Relationship Development***	LI supplier Strong disagree neutral Strong agree 1 2 3 4 5
☐ ☐ ☐ ☐ ☐	There is a strong sense of loyalty to them	☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐	Believe the relationship with them is profitable	☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐	View the relationship as a long-term alliance	☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐	Willing to make investments in this partner	☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐	Willing to provide information they need	☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐	Participate in joint planning and training sessions	☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐	Involve them in new product development	☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐	Share risks	☐ ☐ ☐ ☐ ☐